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New Jersey Short-Term TCE Limits Add To Growing Array Of Approaches

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The New Jersey Department of Environmental Protection (NJDEP) has crafted a limit to protect against short-term exposures from the solvent trichloroethylene (TCE) that differs from methods used by EPA Regions III, IX and X, adding to an array of exposure limits for the common contaminant around the country in the absence of guidance from EPA headquarters.

All the recently developed short-term exposure limits for TCE are derived from EPA's September 2011 Integrated Risk Information System (IRIS) assessment for TCE, which set a reference concentration (RfC) -- or the amount of the substance EPA anticipates can be inhaled daily over a lifetime without causing adverse health effects -- of 2 micrograms per cubic meter (ug/m^3) to protect against non-cancer risks, including cardiac birth defects, decreased thymus weight and toxic nephropathy.

The IRIS assessment incorporated a controversial study suggesting a risk of cardiac birth defects from short-term exposure to TCE. But regulators have struggled to translate the IRIS chronic risk level into a short-term exposure level, resulting in different exposure limits in Regions III, IX and X. Concerns over how to craft appropriate limits has led to an ongoing EPA assessment of how to protect against short-term risk, and also a review by a panel of mostly private-sector risk assessors.

EPA officials have said the agency would like to have a uniform strategy around the country, and that the agency considers resolving the issue is a matter of urgency.

New Jersey's Jan. 17 announcement that updates its vapor intrusion guidance to include short-term levels for TCE as well as other compounds is significant, a former state regulator says, because the state is considered to be a leader in addressing vapor intrusion. Risk assessors in other states might follow New Jersey's lead or at least consider New Jersey's methods when crafting their own policies, the source says.

New Jersey has set a short-term exposure level of 4 ug/m^3 for residential and 18 ug/m^3 for non-residential structures. This is in contrast to Region IX's proposed limit of 15 ug/m^3, Region X's limit of 2 ug/m^3 at residences and 8.4 ug/m^3 for industrial settings averaged over a 21-day exposure period, and Region III's approach where regulators have ordered evacuations from buildings when indoor air levels of TCE reached 27 ug/m^3.

New Jersey's new short-term exposure level for TCE is part of a broader update to the state's vapor intrusion screening levels, which expand the use of short-term exposure levels from 13 contaminants in the 2007 guidance to 48 in the new guidance, according to a Jan. 30 New Jersey Department of Environmental Protection (NJDEP) presentation on the changes.

Vapor intrusion occurs when toxic chemicals rise from below-ground contamination into indoor air through dirt floors, cracked foundations or other pathways. Regulators use screening levels to determine whether contaminant concentrations in groundwater, soil gas or indoor air should be investigated further for vapor intrusion risk. Short-term exposure levels, meanwhile, indicate when immediate action should be taken to prevent health risks.

NJDEP issued the updates through guidance rather than a rule, a move that has drawn criticism from the Public Employees for Environmental Responsibility (PEER) because the public did not have an opportunity to review the changes before they took effect. PEER also charges NJDEP has provided no independently derived scientific basis for the changes, and that the agency weakened screening levels for the common contaminants tetrachloroethylene and methyl tertiary butyl ether.

Short-Term Level

To craft its short-term level, NJDEP started with EPA's recently updated screening levels for indoor air, then rounded up and doubled the federal numbers for residential and non-residential structures. EPA updated its screening levels for TCE in April 2012, setting a residential screening level of 2 ug/m^3 and a non-residential screening levels of and 8.8 ug/m^3. As a result, New Jersey's updated short-term limits for TCE are 4 ug/m^3 for residential and 18 ug/m^3 for non-residential structures. NJDEP's prior TCE short-term levels for residences was 20 ug/m^3. The state previously did not have a short-term level for non-residential structures.

While all regulatory agencies that have crafted short-term levels for TCE exposure have based their limits on EPA data, each one has employed a different method to calculate the limits.

For example, Region IX, which proposed a limit of 15 ug/m^3 for the Middlefield-Ellis-Whisman (MEW) Superfund site in Mountain View, CA, adjusted the RfC for TCE of 2 ug/m^3 to 5 ug/m^3 to account for a 10-hour work day instead of 24-hour residential exposure, and then multiplied that figure by 3 as per an EPA policy regarding short-term limits. The EPA policy on short-term limits is intended to account for uncertainty of non-carcinogenic risk values, according to an environmentalist's memo on the Region IX limit.

A source with California Department of Toxic Substances Control has said that state is using the Region IX limit and requiring mitigation when the 15 ug/m^3 limit is reached until EPA headquarters completes its weight-of-evidence review.

Additionally, Region III has ordered evacuations from military facilities in Virginia when indoor air levels of TCE reached 27 ug/m^3. The difference between the short-term levels enforced by Region IX and Region III, added a new dimension for industry and Defense Department (DOD) critics who have questioned why EPA is enforcing different levels in different parts of the country.

In December, Region X crafted another limit using stricter levels, but averaged over a 21-day exposure duration. Region X's not-to-exceed averages are 2 ug/m^3 at residences and 8.4 ug/m^3 for industrial settings, and the region also specified that limits are to protect women of reproductive age from fetal cardiac malformations.

While industry and DOD have criticized the disparity in EPA's enforcement of short-term TCE exposures, the former state regulator says the differences show regulators are still uncertain of how to protect against TCE's non cancer risks, and so federal guidance is needed.

Part of the problem, the source says, is that assessing cancer risk allows for a risk range, a level of flexibility that current non-cancer risk assessment strategies do not allow. The source also says Region X has taken a helpful step by regulating over an exposure duration, rather than simply using a short-term level that calls for action when exceeded. Still, the source says the different levels, methods and strategies for the same chemical in different regions does not make sense.

A source with a Western state has said the risk of cardiac birth defects from short-term exposure to TCE presents new challenges because regulators normally evaluate risk over exposures of 25 to 30 years. To protect against chronic exposures, regulators usually install subsurface controls to prevent toxic vapors from rising into a building, but it may take a month just to install those controls, the source said, adding that appears too slow to mitigate TCE's acute risk.

With risk from short-term exposure, regulators would likely have to treat indoor air quickly, the source says, adding, "That's a much different type of risk to mitigate."

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